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Glassiness in single crystalline $\text{Y}_2\text{Mo}_2\text{O}_7$ ¹

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The spin glass transition at $T_g = 22$ K in the pyrochlore $\text{Y}_2\text{Mo}_2\text{O}_7$ has remained an enigma in condensed matter physics for over two decades. Despite the results of many experiments which indicate a freezing of the Mo^{4+} spins at low temperatures, a consistent theoretical framework has not been reached to describe how this can occur in the absence of large amounts of chemical disorder. We report on the synthesis of the world's first high quality single crystal of this compound, and its characterization using a variety of thermodynamic and scattering probes. Some of the new results include a non-linear magnetic heat capacity at low temperatures, the presence of liquid-like elastic scattering within the glassy state, and high-Q scattering consistent with orbital or chemical disorder. Possible candidates for the low-T ground state will be discussed.

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